TS 425
.L77
1869

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THE MORNING GLORY.

Littlefield stove manufactory Co.
TS425
.L77
1869
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U. S. A.

ORIGIN OF THE

BASE-BURNING STOVE,

AND ITS

MODE OF OPERATION CLEARLY DEFINED,

BY ONE WHO HAS MADE THEM A STUDY FOR

MANY YEARS.

ALBANY, 1869.

Entered according to an act of Congress, in the year 1869, by
D. G. LITTLEFIELD, in the Clerk's Office of the
Northern District of New York.

44,

Deposited Aug. 19 1869

TS425
L77
1869

THE

LITTLEFIELD

STOVE MANUFACTURING CO

ALBANY, N. Y.

Organized July 25th, 1865, under the laws of the State of New York.

IRA JAGGER AND D. G. LITTLEFIELD,
SOLE PROPRIETORS.

D. G. LITTLEFIELD,
GENERAL SUPERINTENDENT.

IRA JAGGER,
TREASURER.

H. C. LITTLEFIELD,
SECRETARY.

OFFICE NO. 47 MONTGOMERY STREET.

PREFACE.

"Self-feeding" and *semi* base burning stoves, as distinguished from the common stove, employing no "*feeder*," had their origin many years ago; but it is well known to the trade that, prior to the date of my inventions, making them what they were intended to be, such stoves, as a class, were of no practical value.

When, in 1853, the writer devoted his energies to the perfection of this class of stoves, they were unknown to the trade in this country; and, so far as to any reliable information, there was nothing to be found over and above the common "*magazine burner*"— a fire-pot, overhung by a "*feeder*," which arrangement had often been tried, and as often thrown aside as an imperfect machine; but, believing that the principle involved in such stoves was in accordance with the correct theory, the writer was of the opinion that such stoves, having the necessary invention bestowed upon them, would find a place among the things of the household, not afterward to be dispensed with.

That this has been fully accomplished, the many thousands who are now using the Morning Glory Stoves will readily testify.

D. G. LITTLEFIELD.

REGULATOR
THE MORNING GLORY
D.C. LITTLEFIELD PATENTEE, ALBANY
USE SMALL COAL

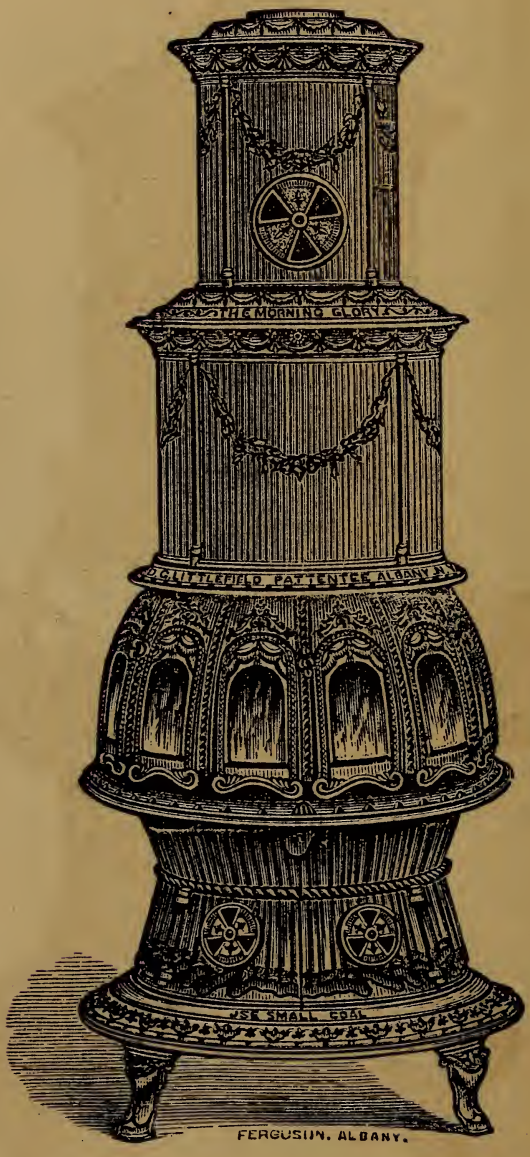
THE MORNING GLORY FOR 1869.

RETAIL PRICES.

NO.	**19**	**LOW**	**TOP,**	**$18 00**
"	**20**	"	"	**21 00**
"	**21**	"	"	**24 00**
"	**22**	"	"	**28 00**
"	**23**	"	"	**32 00**
"	**24**	"	"	**36 00**
"	**25**	"	"	**40 00**
"	**26**	"	"	**44 00**
"	**26**	**HIGH**	**TOP,**	**48 00**
"	**28**	"	"	**55 00**
"	**30**	"	"	**65 00**
"	**32**	"	"	**75 00**

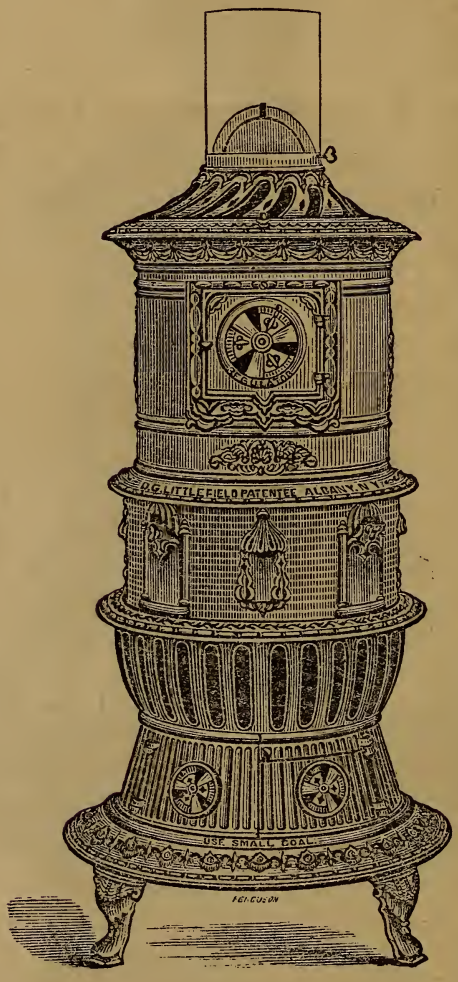
THE MORNING GLORY FOR 1869.

HIGH TOP.



ILLUSTRATING THE NEW CASE FORMED OF DOORS, AN INVENTION OF 1868.

LITTLEFIELD'S PARLOR FURNACE, OR DOUBLE HEATER.



RETAIL PRICES.

AS A PARLOR FURNACE.

NO. 10	$33 00
" 11	39 00
" 12	46 00
" 13	53 00

AS A DOUBLE HEATER.

NO. 10	$32 00
" 11	38 00
" 12	45 00
" 13	52 00

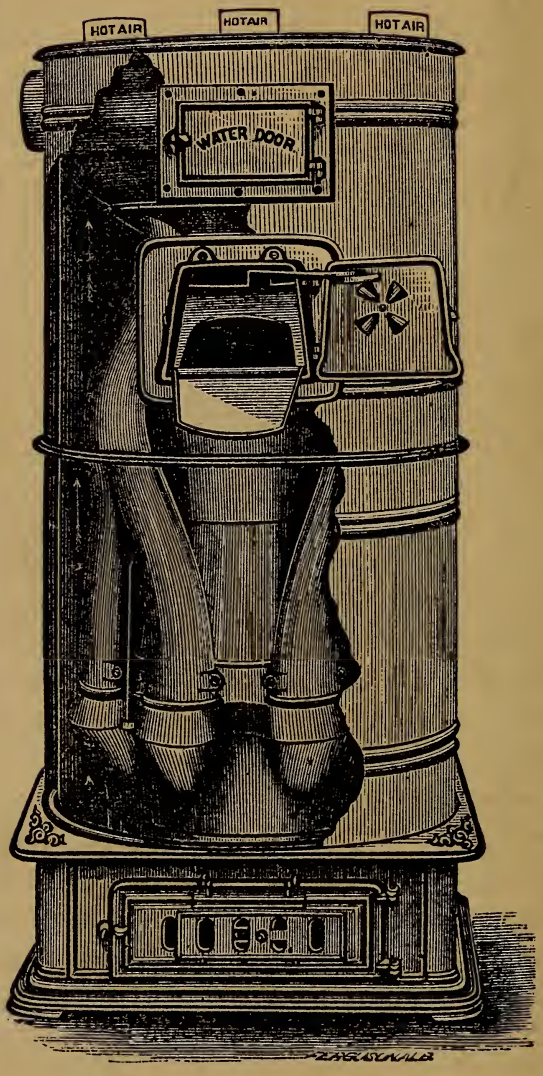
It is expected that Dealers will add to these Prices the freight from Albany to their place of business only. This Furnace can be used for warming the room where placed only, and have an urn on its top, or used as a DOUBLE HEATER, warming the room where placed and rooms above.

The engraving represent LITTLEFIELD'S PARLOR FURNACE OR DOUBLE HEATER, in which is embodied several features contained in THE MORNING GLORY Stoves, so well known to the trade as having been invented and patented since the origin of this invention, in 1859.

The names "PARLOR FURNACE" and "DOUBLE HEATER," as also "THE MORNING GLORY," I hold the exclusive right to use as "TRADE MARKS," irrespective of LETTERS PATENT; making all persons liable to prosecution who use them in any manner as auxiliary in calling the attention of the public to competing stoves or heaters, as thereby the public suffer imposition, while the originator of these names is caused to suffer loss and damage.

These Furnaces are a great improvement upon the old pattern, and have been further improved this season; doing away with much of their former complication, and greatly increasing their heating power, besides making them more substantial and less liable to injury in transportation.

The "PARLOR FURNACE" or "DOUBLE HEATER," was patented in July, 1860; has never been involved in litigation, and all pretence to the contrary *is simply an attempt to perpetrate a fraud upon the public.* The peculiar novelties secured by LETTERS PATENT, and which has given such value to the PARLOR FURNACE, are not to be found in any other structure in market.

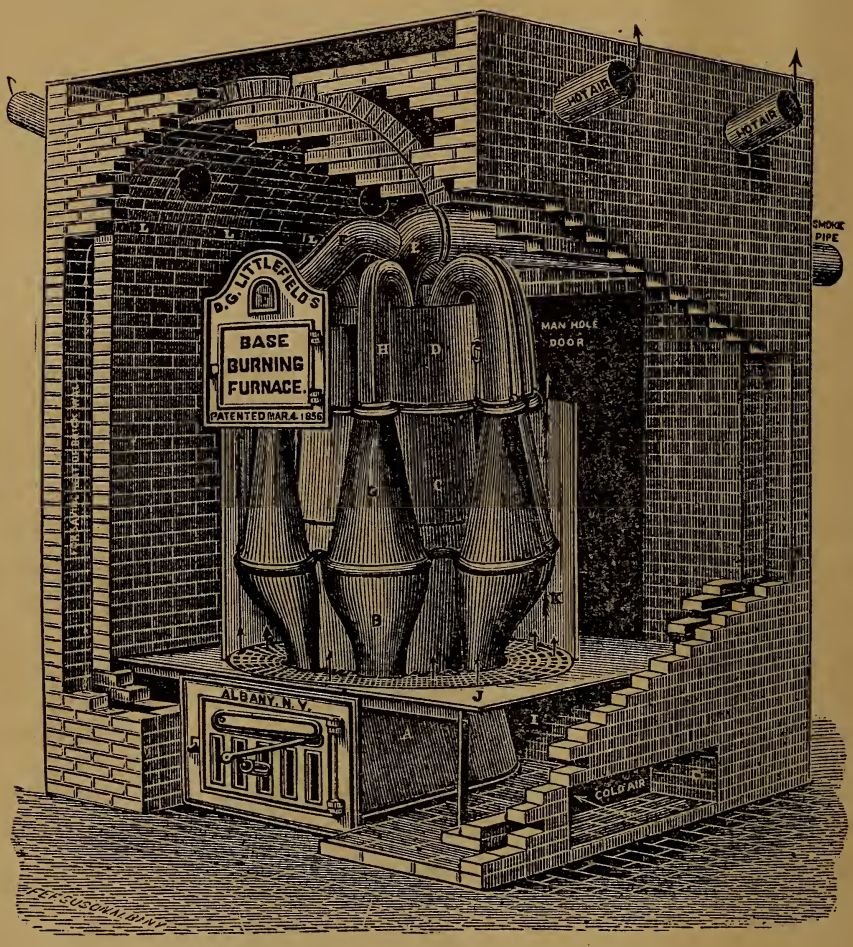

HOT AIR
HOT AIR
HOT AIR
WATER DOOR

THE MORNING GLORY PORTABLE HOT-AIR FURNACE.

No. 15,	Size of Base	28 by 28 inches
No. 17	do.	30 by 30 inches
No. 19	do.	32 by 32 inches
No. 21	do.	34 by 34 inches

The numbers 15, 17, 19, 21, indicate the size of the grate. The diameters of the bases are given to show the space required to set the furnaces, and also indicate their respective capacities.

This furnace has been thoroughly tested for the past six years, and has met our expectations in every respect. It is the most powerful heater, and will do more work for the amount of coal consumed than any portable furnace that has ever been in market. Dealers are authorized to guarantee them to give entire satisfaction. In construction they are simple, made entirely of cast iron, and fitted with care; are self-cleaning, and will burn the entire season without rekindling. In operation they require no more care and attention than one of the Morning Glory Stoves.


HOT AIR
HOT AIR
SMOKE PIPE
D.G. LITTLEFIELD'S
BASE BURNING FURNACE.
PATENTED MAR. 4. 1856
MAN HOLE DOOR
ALBANY, N.Y.
COLD AIR

THE MORNING GLORY
BRICK FURNACE.

The BEST FURNACE in market, without any exception. One fire will last the entire season without rekindling; emits no gas and is a perfect thing in itself. The sale of this furnace is very extensive. The best of references can be given of the truth of this statement. All furnaces guaranteed. Send for a pamphlet, giving the names of more than two thousand persons using these furnaces.

No. 19, size of brick work,	**5 feet 4 inches**	**by**	**5 feet 7 inches**
No. 22	**do. 5 feet 8 inches**	**by**	**5 feet 11 inches**
No. 26	**do. 6 feet**	**by**	**6 feet 3 inches**

Either size can be put up in a cellar that is six feet and six inches in the clear. The numbers 19, 22 and 26 give the diameter of the grate and the magazine of each size respectively.

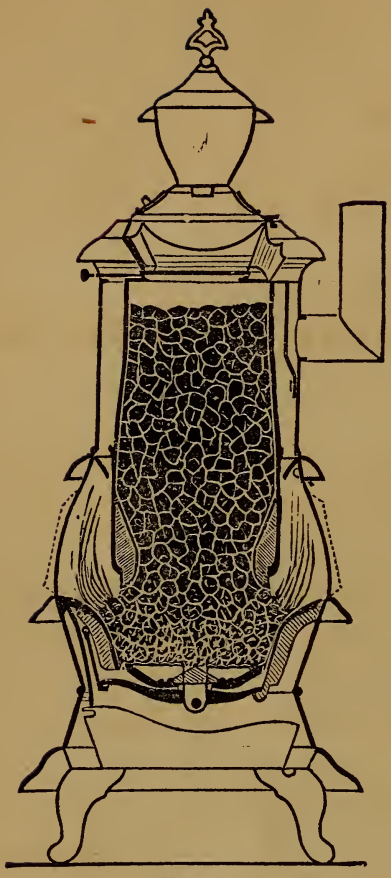


Fig. 1.

Fig. 2.

Fig. 3.

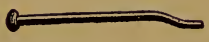


Fig. 4.

Fig. 5.

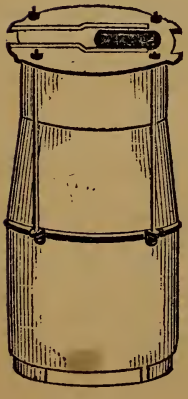


Fig. 6.

Fig. 7.

Fig. 8

Fig. 9.

THE MORNING GLORY FOR 1869.

DESCRIPTION OF THE PARTS COMPOSING IT.

Figure 1.—A perspective view of a central vertical section of the stove as a whole, from front to back, having its MAGAZINE filled with coal.

Figure 2.—The HOPPER detached, and first to be removed, after removing the top plate of the stove, to repair the interior construction.

Figure 3.—The MAGAZINE COVER, removed from the stove.

Figure 4.—The MAGAZINE-COVER HANDLE, detached from the cover, as when the two are removed on taking the stove apart.

Figure 5.—The FLUE PLATE, which, in place, forms the downward passage to the smoke pipe; to be removed before lifting the MAGAZINE from its place.

Figure 6.—The MAGAZINE, as removed from its place for repair or for other purposes.

Figure 7.—The TOP COVER, draught REGULATOR and URN BASIN, as removed from the stove preparatory to taking the stove apart.

Figure 8.—A view of a segment of the DUST REGISTER and MILL GRATE, as seen from the top after the MAGAZINE is removed.

Figure 9.—A ring of SPURS projecting inward from the interior case, and deflected downward for the purpose of steadying the MAGAZINE, and keeping it in its proper central position when the stove is in operation.

A NOVEL CONSTRUCTION.

The peculiar construction of the MORNING GLORY for 1869 was secured by *Letters Patent* bearing date the 21st day of April, 1868. This stove embodies several important features, including the new mode (an invention of last season) of constructing its case — forming it of doors, hung by a concealed hinge, and so that they may be dropped to a horizontal position upon every side of the stove, when required, either for mounting the windows with mica, or for cleaning them when the stove is in operation.

These stoves are now constructed entirely of cast iron, but when required they can be made with sheet-iron upper section. Their ornamental finish is drapery, making them a handsome piece of furniture; and though they resemble the former patterns of these stoves in their internal construction, they are quite different, making them more durable and less difficult to be repaired. In fineness of casting they are of the highest order, fully equaling the finest castings made in this country.

Though the patterns for these stoves were originally so constructed that sheet iron might be used for their upper section, such stoves are now seldom called for; and from practical tests we are fully of the opinion, based upon an experience of three years, that there are in fact many reasons why the cast-iron top is preferable. *The non-liability to rust, the safety in shipping and handling, the increased heating surface, their tightness to keep in the dust*, make of them a stove that cannot be produced composed in part of sheet iron. This — considering the fact that these stoves are so constructed that any person of ordinary skill can do his own repairing, by replacing the parts destroyed by the action of the fire — makes of them a stove many years in advance of any of its competitors in contending for public favor. The removal of the top plate (see the annexed drawing) permits all of the interior parts of this stove (patent of 1868) to be removed and replaced and kept in their proper places, by simply rebolting the top plate to its seat.

HOW TO SELECT THE PROPER SIZE.

An intercourse of many years with those dealing in and using heating stoves has convinced me that a majority of persons, when purchasing heating stoves, select sizes that are too small to heat economically the space required to be heated. It is poor economy to save a few dollars, by taking a small size, and afterward discover that it is too small for the work required of it.

These stoves have been manufactured with a view of having them suited to rooms of certain size. For a room of ordinary height of ceiling, and taking to cover the floor, from

15 to 20	square	yards	of	carpet,	a No. 19, 20 or 21.
20 to 25	"	"	"	"	21 or 22.
25 to 35	"	"	"	"	22 or 23.
35 to 45	"	"	"	"	23 or 24.
45 to 60	"	"	"	"	25 or 26.

Should there be more than the usual number of openings (doors and windows), or any other cause to render the heating of the room more than ordinarily difficult, a larger stove than indicated should be used.

Few persons realize that a room 21 feet by 21½ feet is more than twice as large as one 15 by 15, or that one, the ceiling of which is 12 feet high, has one-third more cubic feet of space than one of the same size and 9 feet ceiling.

Nos. 26, 28, 30 and 32, High Top, are designed for large rooms, halls, stores, etc., and, of course, the size used should be selected to the size of the room.

HOW TO PREPARE AND HOW TO USE THEM.

1. See that the stove, when purchasing, is perfect; that the mica windows are all properly fitted, and that the dust register will open and close properly. See that the pipe is properly fitted, and that there is no other opening to the same flue left open. Ordinarily, a damper in the pipe is not required; but, when the chimney has a powerful draft, a damper may be used to advantage, but it should be so adapted as never to entirely close the smoke pipe.

2. *Size of coal.* Large coal cannot be properly burned in any ordinary size stove. Many very good stoves have been condemned for improper attention to this point. Where the quantity of coal under ignition is small, if too large in size, too free a circulation of air through it *will* take place, which *will* have the effect to deaden the fire and retard combustion, and sometimes result in giving to the stove a reputation for being a poor heater. For the Nos. 19, 20 and 21, either the "nut size" or "chestnut size" coal is indispensable. If possible, procure this

Chestnut Size.

Nut Size.

size coal for either of these three sizes. Where the draught of the chimney is good, the Nos. 22, 23 and 24 will do as well with these sizes as with any other, but they can be used with entire success, burning the "small stove" size. The Nos. 25, 26, 28, 30 and 32, notwithstanding they will burn the "chestnut" or "nut size," where the draught of the chimney is good, will do better, if the "small egg" or "small stove size" coal is used.

SMALL EGG, OR SMALL STOVE SIZE.

No dealer should recommend, and no person should undertake to use these stoves with larger size coal than here represented. At places where small coal cannot be procured, there need be no difficulty, providing coal of any kind can be obtained, as large coal can always be converted to a smaller size. A laboring man, once shown how to do it, will consider himself well paid on receiving one dollar per ton for breaking up either lump or large furnace coal to a proper size to be burned in these stoves; and the user of the MORNING GLORY, or any other stove, will find it far more economical to pay the price of having his coal properly prepared, than to worry through the winter suffering the inconvenience and loss attending the burning of coal too large in size for the purpose required of it.

3. *To put the stove in operation.* First, see that the stove is properly put up — that the pipe fits well on the collar, and tight at the chimney, and that there is no other opening to the same flue left open; see that the DUST REGISTER is closed by moving it to the right, open the damper in the smoke pipe, if you have one, then open the TOP COVER, and next the MAGAZINE COVER, and see that the grate is in its proper place; put in a quantity

of paper or shavings, then a quantity of charcoal, if at hand (if not, use wood cut into short blocks), on top of which a small quantity of hard coal, varying from two to six quarts, according to the size of the stove; now close the TOP COVER and the REGULATOR, leaving the MAGAZINE COVER open while igniting the kindlings, to avoid smoking the windows. Thus prepared, the kindlings may be ignited by holding a lighted paper in the ash-pit, or with a match by opening one of the mica doors. When the kindlings are well ignited and most of the smoke has passed off, it is safe to open the TOP COVER and fill the MAGAZINE with fuel, or such quantity as may be required for the time. Now close both the TOP COVER and the MAGAZINE COVER, and afterwards keep them closed at all times, except when necessary to open them for supplying coal or rebuilding the fire.

4. *Supplying coal.* The MAGAZINE should be *filled* with coal as often as once in twenty-four hours, and, when required by the coldness of the weather, it should be *filled* as often as twice in twenty-four hours. Have some stated time to attend to this, as the stove will do better and last longer if its MAGAZINE is kept *filled* with coal.

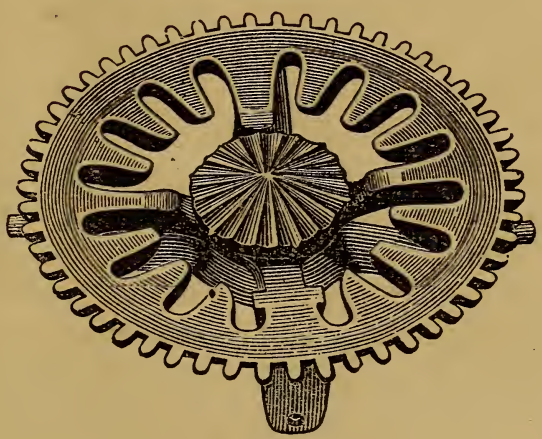
5. *Opening and closing the covers.* Before opening the TOP COVER, close the REGULATOR and open the damper in the pipe; then open the MAGAZINE COVER; next open the TOP COVER.

This management, owing to the interior construction (patent of 1862), will compel the passage of the gases that may have accumulated in the MAGAZINE to pass to the chimney, and thereby avoid any liability of a PUFF, or the escape of any gas to the room. Also, to avoid a PUFF from confined air in the magazine, *before* closing the MAGAZINE COVER, *close* the TOP COVER and the REGULATOR.

6. *To regulate the stove's action.* This is done by means of the DRAUGHT REGISTERS in the ash-pit doors, in conjunction with the REGULATOR upon the TOP COVER. If it cannot be done satisfactorily by these means, make use of a damper in the smoke pipe. To check the fire, close the REGISTERS and open the REGULATOR. To give the stove its strongest power for heating, open the DRAUGHT REGISTERS in the ash-pit doors and close the

REGULATOR upon the TOP COVER, leaving the damper in the smoke pipe open.

7. *To dump the grate.* With a good quality of coal, this will never be necessary, as the MILL-GRATE will grind up the slag



and slate from such coal so perfectly that the fire-pot will be as clean on a fire three months old as at the expiration of forty-eight hours; but, should it become necessary, from the use of poor coal, or from any other cause, to dump the grate and clean out the fire-pot, it can be done with ease by disconnecting the end of its three-pronged bar from the hook on which it hangs, when the grate will tilt from its own weight, and empty the fire-pot.

8. *To avoid dust when shaking the grate.* This is done by closing the REGULATOR on the TOP COVER, and *opening* the damper in the smoke pipe (if one is employed), and opening *only one* of the ash-pit doors, and moving the DUST REGISTER to the left. *It may be set down as certain, that, if any dust comes from the stove on shaking the grate under these circumstances, either the draft of the chimney is totally deficient, or the back flue of the stove or smoke-pipe is filled with soot*, and instead of fretting about the dust, call in the "stove doctor" and have the matter put right. After shaking the grate, remember to close the DUST REGISTER, and *then* close the ash-pit doors, *and keep them closed at all times*, except when shaking the grate or opening them to remove the ash-pan. It is very liable to injure the stove, besides putting the fire out of proper condition, to permit the ash-pit doors to remain open longer than necessary to shake the grate and remove the ash-pan.

9. *To rebuild the fire.* When the fire is out from neglect to supply coal, do not dump the grate, but shake out the ashes and kindle on the old coal the same as on the grate in the first instance, which can be done with ease, unless the quantity remaining more than fills the pot, in which case shake out a portion until the depth is only from four to six inches, which will ignite from the top and burn down to the bottom. It is bad for the stove to dump the grate very often, as a new fire burning upon the grate will sooner destroy it. Besides this, the building of one *new* fire undoubtedly does more injury to the stove than three months' use keeping the same fire continuously. Therefore, the fire-pot should never be cleaned out except when it is absolutely necessary.

The MORNING GLORY stove, like any other mechanical device, must be used in accordance with the instructions given, and *must have* that reasonable attention required by the law of its being, in order to bestow the full benefits that may be derived from its use. It is, in fact, a *base-burning stove* — a scientific machine reduced to simplicity of construction; and so much so that any person who will read the foregoing instructions, having one of the stoves for examination, can put it in operation, and produce with it precisely the same result that can be produced by the inventor himself.

ECONOMY.

How much coal will it burn? This question is often asked by those in pursuit of a stove; and it is no easy matter sometimes to give a truthful answer. The MORNING GLORY, though it now enjoys a reputation far more favorable than ever attained by any other stove, has not obtained its celebrity by its *published claims* to economy in the use of fuel; but has made its way into public favor for the reason that those who use them give them the highest praise, not only as to their economy, but in all other respects. It is a settled fact, that by their use, on an average, more than one-third of the fuel is saved as against any other stoves. The writer, though neglecting to write upon this particular subject, has conversed upon it thousands of times, and has made it a custom for many years when asked how much

coal the MORNING GLORY stove would require to warm a certain size room, to ask the customer what kind of a stove he had been using; and receiving his reply, would ask if he had warmed his room; when, if the customer replied in the affirmative, without caring to know the quantity of coal that had been burned, to guarantee a saving of one-third over the former stove. Such a guarantee has been given hundreds of times, and never in a single instance has the customer failed to receive the satisfaction guaranteed. But when the party using other stoves had failed to warm his room and was disposed to try the Morning Glory, then no guarantee as to the amount of coal to be burned could be given, simply for the reason that the room had never been warmed, and it was unknown how much heat was in fact required, and consequently a warm room only could be guaranteed. Hundreds of such customers have afterward found no difficulty in *warming* their apartments with less coal than was consumed with their former stove, and which could not be made to give the desired amount of heat.

As to this question of economy, it is safe for any dealer in the Morning Glory stoves (and the Littlefield Stove Company will so guarantee) to treat the matter in just this way, viz.: For all persons that have been able to warm their apartments with any other stove, whether it was a common stove or one of the numerous base imitations and CALLED *Base Burners*, to make them sell, if the customer has succeeded in warming his apartment with such stove, to put up for him a MORNING GLORY of 1869, and guarantee equal heat with an economy in fuel of at least one-third. In some instances more than this can safely be guaranteed, as for instance on the large sizes — the Nos. 28, 30, and 32. In many places these sizes will do the work in a satisfactory manner with half of the coal other large stoves have burned and failed to answer the purpose required of them.

REVERTIBLE FLUES.

It is a favorite theme for those compelled to sell the BOGUS BASE BURNERS (the people all wanting the GREAT IMPROVEMENT, and the MORNING GLORY being sold by only one dealer in a place), to attempt to make their way into the affections of

the public, by claiming that their stoves are an "*improvement* upon the MORNING GLORY." That their stoves have "*a flue in the base*," claiming for such stoves, that they are BASE HEATERS, but neglect to inform their customers that the first MAGAZINE STOVE LITTLEFIELD ever made was a REVERTIBLE FLUE STOVE. Most of these gentlemen well know that LITTLEFIELD was the first to combine with MAGAZINE STOVES the REVERTIBLE FLUE, and that he abandoned such construction in 1853, as being wrong in principle, and did not apply for a patent upon said combination for that reason. When called to account, these gentlemen excuse themselves by saying that their customers *will* have a BASE BURNER; and, since necessity compels them, think they may as well go a little further and supply *their* customers with a BASE HEATER. It is certainly a cool proceeding for manufacturers to pick up discarded ideas of mine and seek to impose them upon the public as "improvements" upon the MORNING GLORY. Such men are slow to admit that all of the MORNING GLORY STOVES made since 1864 have been BASE HEATERS; or that such was the object of my improvements made and patented in 1863, or that such improvements have been embodied into the present pattern of the MORNING GLORY stoves. But, instead of this, continue to harp upon my faulty construction of 1861 and '2, and falsely insist that none of the MORNING GLORY STOVES will heat at the base,—statements which they well know to be contrary to the facts.

It is true that stoves should radiate a portion of their heat from the base; but it is also true that the extreme lower part of the stove should not be its most intensely heated portion.

A method of construction that will permit the base of the stove to be *properly* heated without having a flue there to clog up and fill with ashes, is far more preferable to a method well known to be wrong in principle, to say nothing of the trouble in cleaning out such flue at least once a month.

The first purpose of a stove is, or should be, to produce, as near as possible, a perfect combustion of the fuel, for thereby depends the economical working of it. The second purpose is, or should be, to dispose of the heat produced thereby; and this, without permitting *any* of the poisonous volatile products of

combustion to escape to poison the air of the room. The third purpose is, or should be, to so dispose of the heat that all parts of the stove shall be *properly* heated, and that *only* so much of the heat produced shall pass to the chimney as will insure a proper combustion of the fuel, the primary object of the construction.

With these purposes in view, and commencing with eight years' experience in the construction of BASE BURNING STOVES, I have since been nine years in bringing the MORNING GLORY stove to its present state of perfection. I have sought in good faith not to cater to the crude notions of the public in these matters; but to produce what should be, in fact, a perfect machine; and, while I am not yet prepared to claim for the MORNING GLORY absolute perfection, I do claim for it a degree of perfection not heretofore attained by any similar device, and which cannot be reached by any person, providing my rights as a patentee are respected, until the expiration of my patents of December 9th, 1862, and August 18, 1863.

To any person competent to judge in these matters, it requires no argument to show that these purposes are laudable, and in accordance with correct principles, and that nothing could more certainly promise defeat than to turn aside from the *correct* method and cater to the whims and notions of those who really do not have a correct knowledge in these matters. And, to combine with this class of stoves a flue which should turn all the products of combustion down below the ignited fuel, would be just this. Therefore, notwithstanding some of the grandmothers and grandfathers, who have lost most of their vitality, and *require* a place to *heat* their feet, may call for such a stove, and my opponents finding it safe to bring forward an erroneous and abandoned idea of my own on which to compete with the MORNING GLORY, and have, through great efforts, produced, to a certain extent, a call for such stoves, I shall continue to construct the MORNING GLORY in accordance with the correct theory, and give them the entire field on REVERTIBLE FLUE STOVES.

Such a stove, if the flues are made use of, cannot by any possibility produce a proper combustion of the fuel, for the reason that when the products of combustion are turned down below

the burning coal, the gaseous products cannot *freely escape* as they should from the coal that is in a state of ignition; resulting in *filling* the interstices among this coal with such gases, and, they filling such space, atmospheric air to supply oxygen (the supporter of combustion) cannot *freely* enter as it should, and mingle with this highly heated coal. The result is a *dead red fire*, when it should assume the form of a white glow of heat, converting the stove (*by the use of the revertible flue*) into a distilling apparatus, in which the coal is simply converted into CARBONIC OXYDE (carbon half oxydized, attended with a loss of FOUR-FIFTHS of its heating power), and in this state passed to the chimney and wasted at the house-top.

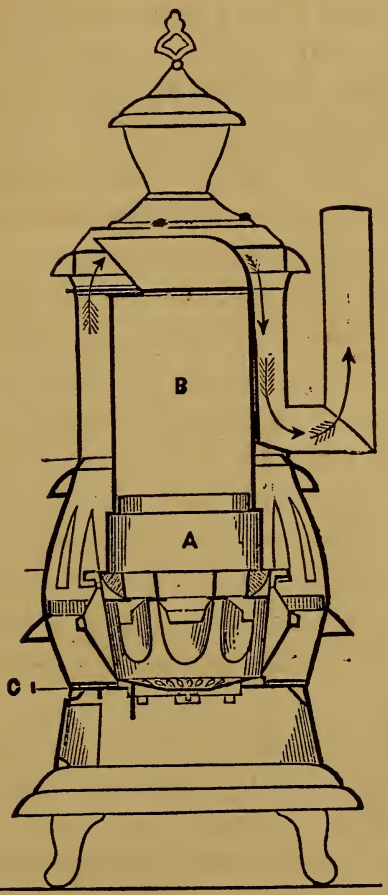
No wonder that with such stoves so little heat passes to the chimney. A method of construction that *will* permit the coal to be properly burned,—that is, that will permit its carbon to be combined with its *full* portion of oxygen, and thereby (the only way it can be done) evolve *all* its heat-giving power, necessarily heats the smoke-pipe and chimney, as it does the whole stove.

It is far more economical to evolve *all* the heat-giving power of the coal, though two, or even three-fifths of it shall find its way to the chimney, than to employ a construction that can only evolve *one-fifth* of its heat-giving power, and pass no heat to the chimney.

But the most serious objection to a REVERTIBLE FLUE MAGAZINE STOVE, is the fact that when such flues are used a fullness is created in all that portion of the stove above the burning fuel, and when we consider that this space is thus filled with a deadly poison, which *will*, more or less, escape to poison the air of the room, we shall realize the greatest objection to that class of stoves.

If coal cannot be burned without endangering the health and life of those who use it, it should not be burned at all. Unlike wood, it cannot, owing to its chemical properties, be burned without producing poisonous gases; making the most important element in a construction devised to avoid difficulty from them, the means by which *all* of these gases shall be conveyed to the chimney. This was the position assumed when, in 1861, I constructed the first pattern of the MORNING GLORY STOVES.

DIAGRAM OF THE STOVE OF 1861. PATENT OF 1862.



It will be observed, by the above diagram, that in this stove the fire-pot A and the magazine B, were inclosed within the same chamber, formed above the line C, and being so constructed could impart but little heat to that part of the stove below the line C. This was the pattern of the MORNING GLORY that would not heat sufficiently at the base, and which "my friends" seem to insist upon as being made at the present time. But however faulty this stove might have been in that respect, it has been proved beyond question that it has never had its equal except in the MORNING GLORY STOVES made since that time.

By this construction the hot products of combustion emitted from the fire were to have room for immediate expansion; or, in other words, were to pass to a space that was never to be filled, and consequently to have at all times permission to *pass freely* from the ignited solid fuel; and to be retained at the point of expansion long enough to part with a large share of their heat, and to then pass upward into a gradually contracting part of the chamber, and by these means impart a more uniform degree of heat to the transmitting case.

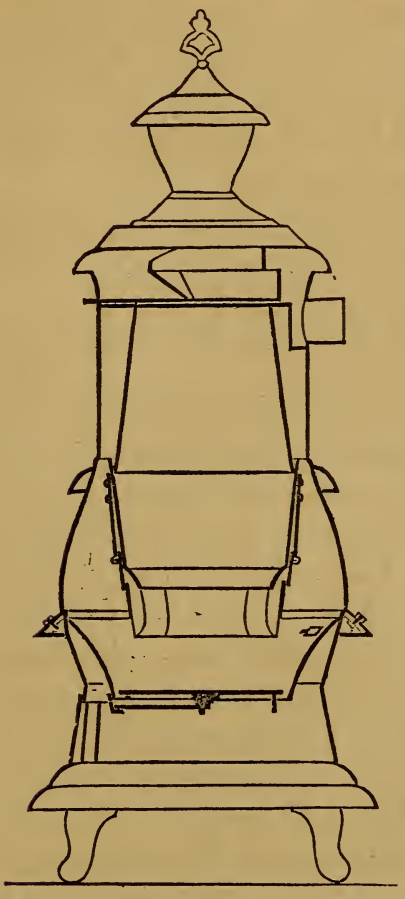
For the purpose of giving to the stove the highest degree of efficiency and economizing the heat, the interior arrangements were so constructed that these hot products of combustion should be forced into full contact with all parts of the surrounding case throughout its whole extent, including its front and its extreme upper and rear portions, and then be turned downward to the exit flue, and this, *without creating an entire fullness of said chamber*, so tested before the stove was put in market. Thus was produced a stove, that, however faulty it might be in other respects, was certain when properly used to convey *all* of the poisonous gases to the chimney.

From its first introduction in 1861, the MORNING GLORY has been increasing in popularity, and notwithstanding its imperfections at the start—which were many—the first patterns being hardly more than experimental, it was found in practice that its theory of construction, so far at least as to the combustion of the fuel *and the entirely safe disposal of the poisonous gases*, was correct.

Many of these defective stoves are still in use, their owners prizing them as an heir-loom, having them repaired year after year, when they could save money by throwing them away to be replaced by the present patterns. But knowing them to be a heathful stove, dare not give them up for fear they cannot find their equal.

Notwithstanding the stove of 1861–'2 did not impart but little of its heat from the base, there was no complaint in that respect, but for the purpose of better economizing the heat produced by its perfection of operation, I devised the construction patented in 1863.

DIAGRAM OF THE STOVE OF 1863.



It was my purpose in this construction to save over the former construction just that amount of heat which was radiated from the surface of the fire-pot. In the former pattern, the fire-pot, being inclosed by the same chamber that inclosed the magazine, radiated all of its heat to that chamber; and the theory was, that said chamber, receiving all the heat from the products of combustion, was not, as constructed, additionally heated by the heat radiating from the surface of the fire-pot; and that so much heat was consequently lost, which might be utilized if the heat thus radiating from the fire-pot could be conveyed to a chamber separate from the chamber surrounding the magazine.

To accomplish this, the fire-pot was suspended in a separate chamber (see diagram) formed by the bottom of the stove, and the cylinder resting upon it, forming a chamber surrounding the fire-pot, so that all the heat radiating from its surface (always highly heated when the stove is in operation) was radiated to said chamber, and transmitted to the case forming it, which chamber, as will be seen, formed the lowest portion of the stove.

Thus was produced, in 1863, a BASE-HEATING MAGAZINE STOVE, which, "my friends"—notwithstanding all their efforts in that line have been made since that date—do not seem to remember, or that the idea of "BASE HEATING" did, in fact, originate with me.

For the purpose of showing the utter absurdity of the pretense in some quarters, that the MORNING GLORY does not heat sufficiently at the base, I will relate one of many similar incidents. The first season that the BASE-HEATING MORNING GLORY was sold at Lowell, Mass., about fifty were put in use there. During the winter, I was there on business with Mr. N. J. WEIR, our agent at that city. At that time the various BASE-HEATING STOVES, now making claim to public favor, were not before the public; consequently, Mr. WEIR was a novice on that question. On making inquiry as to how the stoves had pleased, he replied that all with the exception of one had given the very best satisfaction; and went on to state that in that instance the customer, after using the stove some two or three weeks, discovered that his oilcloth and carpet under the stove were completely destroyed, and the floor actually charred by heat coming from the bottom of the stove, and was afraid to continue its use, fearing it would set his house on fire; that he had prevailed upon the party not to give it up, and had put a piece of zinc under it, over which and about half an inch from it, and resting upon legs, a piece of Russia sheet iron, a little less in diameter than the stove bottom; since which time there had been no complaint, even from that stove. The difficulty in that instance was owing to the neglect to use zinc or some other metallic protector in the first instance—which precaution should always be had before starting a fire, in order to insure

the safety of the oilcloth or carpet, or even the floor when the stove is used in a room where there is no carpet.

It is sometimes said that the REVERTIBLE FLUE keeps the heated products of combustion longer within the stove. This may be true in some cases, but it is not so in any of the so-called BASE HEATERS, as against the MORNING GLORY. It will be found upon actual measurement, that in the MORNING GLORY the heated products of combustion, in their passage from the fire pot to the exit flue, are retained longer and caused to travel nearly three times the distance before reaching the exit pipe than in any of the revertible-flue stoves.

HOW BASE-BURNING STOVES SHOULD BE CONSTRUCTED.

It can in truth be said that the most economical stove is the one that produces the most perfect combustion. But few persons, even among stove manufacturers, have a correct knowledge of the

CHEMISTRY OF COMBUSTION —

and among those who use stoves there is a more profound ignorance on the subject — a correct knowledge of which would be of vital importance to the community.

Combustion, whether for producing light or heat, is their development by chemical combinations; and *perfect* combustion should be produced, whether it be in the burning of a candle or any of the various fluids for illuminating purposes, or of anthracite and other fuels for heating purposes; and perfect combustion is the combination of the carbon of the combustible with the largest measure of oxygen with which it is capable of uniting.

It is an absurd notion entertained by many persons, that a given weight of coal, however burned, will produce *only* a certain amount of heat. Nothing can be more untrue. It might as well be said that a candle gives the same light when it needs trimming, or that the lamp does as well toward lighting the apartment when it smokes, as to say that ANTHRACITE when half burned will produce the same amount of heat as when burned perfectly.

The well-known fact in chemistry that chemical combinations can only take place in certain definite proportions, ought to be understood by every person, viz.: That to produce the poorest quality of combustion (and there are only two that can be produced, *perfect* and *imperfect*), six parts of carbon combines with eight parts of oxygen to form carbonic oxide; and that the fuel *thus* consumed only yields 20* per cent of the heat it is capable of producing. But as combustion is intensified in the common stove, even though it may have a "feeder" applied to it and called a "BASE BURNER," it is only a part of the fire pot that can become sufficiently heated to give to any portion of the fuel such an affinity for oxygen that eight more parts may be taken into the combination.

According to that law of chemical combinations which has been established since the world began, there is no intermediate combination in which six parts of carbon can combine with more than eight, and less than sixteen, of oxygen. The two may be mixed in any intermediate proportion, but not as a chemical unity; and, therefore, no heat is produced by the mixture beyond the degree required to form carbonic oxide, unless at the expense of fuel, until the burning is at such an intensity (which it cannot be in the common stove) as will permit the second portion of the oxygen to enter into the combination.

Understanding these facts, it will readily be seen that such stoves can only produce carbonic oxide, and a low degree of heat; and that this is always the case until the whole quantity is fully ignited, after which, if the depth of coal is not too great, the product passing from the center of the fire pot may, by possibility, be carbonic acid; but it can only be so at that point, for the reason that the exterior coal resting against the sides of the fire pot is cooled, so that it cannot take up the

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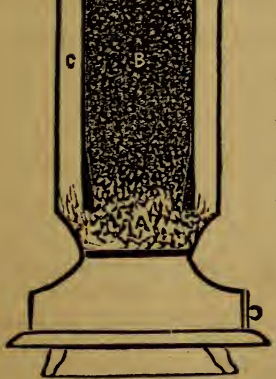
* A diversity of opinion exists among scientific men as to the amount of heat produced by burning to produce carbonic oxide, or carbonic acid. DULONG estimates that burning, to produce carbonic oxide, only produces 20 per cent; ANDREWS 28 per cent, and GRASSI 43 per cent. DULONG, being the authority quoted by Professor BUNSEN and Dr. LYON PLAYFAIR, in a report on Blast Furnaces (see *Report of the British Association for* 1845), would seem to be the best authority.

second portion of oxygen, resulting in a loss to the extent of 80 per cent, if DULONG was correct in his estimate; and to this extent from all portions of the coal which is below the temperature required to permit the *full* proportion of oxygen to combine with it.

This is a fair statement of the case, being simply truisms well known to experts in such matters since the philosophy of combustion was reduced to a science; and it has also been as clearly known to the scientific world, that the common "*up draught*" stove originally intended for burning the various kinds of friable and tender fuels which contain a large portion of oxygen as a component part, was an unsuitable adaptation for burning a solid fuel, containing but little or no oxygen. Hence, the theory, that, to produce an economical combustion of a compact fuel, *it must be so heated before it reaches the place of combustion*, as to give it an affinity for ogygen, and afterward meet it inversely, permitting the gaseous products to pass off sidewise, and to a space never to be filled, in order to more completely saturate the carbon with ogygen from the air — the supporter of combustion — or, in other words, to insure a more perfect combustion.

Out of this theory grew the "*Magazine Stove*," composed of three active parts or elements, viz.:



A fire-pot (A) or place where the fuel is burned, overhung by a magazine (B) to contain a supply of reserve fuel, and a surrounding chamber (C) made vacuous by its connection with the chimney flue, and through which the products of combustion were transmitted, known only as a "*Magazine Stove*," prior to the date of my inventions.

An expert, speaking of such construction as a principle, or mode of operation, would say, that, inasmuch as it was intended to contain an oversupply of fuel, its action was intended to be regulated by the air supplied at the base, and so constructed as to ignite but little fuel, and burn it at a more

elevated temperature, and that the primary object of such construction *was to prepare the cold fuel for a more perfect combustion by heating it, and thus giving it a greater affinity for oxygen before it should descend to the place of combustion.* A purpose far different from that of suspending a small tube over a fire-pot to serve simply as a *feeder*," or to so construct a magazine that it can *only* contain the *solid fuel*, and permit the volatile to pass off through its open sides, or from its open top, and go to waste.

Stoves of this character were constructed in England many years ago; and many will remember that substantially the same construction was manufactured and sold at Albany some thirty years ago by the late Dr. Nott, and known as the Nott Stove.

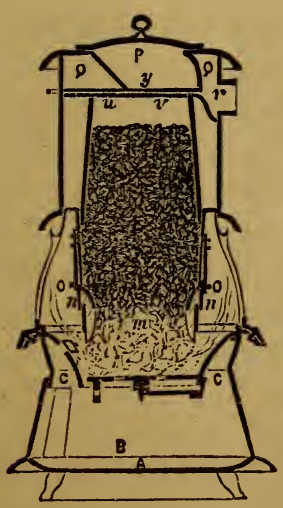
It is well known that the Nott Stove, notwithstanding its great popularity at the time, and for several years afterward, was practically a failure, and long since ceased to be regarded as of value. One of the works of this truly great man was an attempt to teach the people how to burn coal, and it is to him I am indebted for my own information on this subject, far more than to all other persons; but his stove, like those that had been made before that time, having one great defect which its constructor failed to discover, was compelled to succumb at last, and, like its predecessors, be known in the books only, which lie dusty with age upon the shelves of our libraries.

The Nott Stove, as also the original *Magazine Burner*, was intended to ignite but little fuel, and to burn it at a high temperature regulated by the supply of air at the base, but it was faulty in that it afforded access to air, also, from above, entering the magazine through the unavoidable crevices around its cover, and passing thence downward through it to the fire. This downward current was increased, both in volume and rapidity, by reducing the supply at the base, and could be checked only by the objectionable means of partially closing the smoke-pipe. The disturbance thus introduced, precluding any effective control of the action of the stove, was itself sufficient to insure its ultimate failure. At least this was my theory at the outset, and time has proved that it was a correct one.

If it be asked why it was with such stoves that more or less air was constantly passing down through the supply coal, the reply is by referring to the fact that to heat a combustible is to give it an affinity for oxygen so that air is drawn toward it; and the fuel being cold when placed in the magazine, its interstices were unavoidably filled with atmospheric air. The fuel in the fire-pot being heated, such air was attracted to and passed to the fire-pot. And as the cover opening to its magazine could not be made absolutely air-tight, more or less air would pass in under it to fill the place of that among the supply coal *which necessarily passed to the burning fuel.* Hence it will be seen, that, with such constructions, there was at all times more or less atmospheric air mingling with the supply coal, *and from that direction*, passing to the fire-pot, when it should only have been permitted to pass thereto at the base.

As the objects of my inventions have been to improve and make valuable this class of stoves, it follows that my stoves employ the same elements, viz.: A fire-pot, overhung, not by a simple "*feeder*," but by a *preparing magazine for reserve fuel*, and a vacuous chamber to receive the products of combustion from the fire-pot and transmit them to the chimney flue, varying in their combination from the stoves referred to, in that said chamber is so constructed as to inclose the cover opening to the magazine.

THE MORNING GLORY.



It will be observed that in this stove the exterior chamber incloses the cover opening to its magazine, forming by means of the exit flue leading to the chimney, a vacuous chamber to surround said cover, and thereby insure the proper action of the stove. When thus constructed, it is impossible for any atmospheric air which may find its way into the exterior chamber, to gain access to the magazine, for the reason that the vacuous space thus formed by the chimney flue has more power to draw it in that direction than the heated fuel has to take it in under the cover to its magazine.

In the practical use of THE MORNING GLORY, it has been found that its great utility consists *in its ability to accumulate within its magazine, a volatile combustible*, taken up from that portion of the fuel highly heated, but not in a state of ignition. Such accumulation from the fullness of the magazine passes down to the fire-pot, where it meets the air coming up through the grate, at the base, when its combustion takes place. *Intensifying the heat at that point, and causing the coal at the base, and at the exterior surfaces, to be the first portions consumed to ashes, making, in fact, a* BASE BURNING STOVE.

To exhibit more clearly the difference in the action of THE MORNING GLORY, and the before-mentioned constructions, it may be said that in starting the fire, they are identical. So, too, with the condition of the supply coal when placed therein, in each having its interstices filled with atmospheric air which passed therein with the coal. So, also, that the air among the supply coal is attracted to, and passes to the burning fuel. At this point the parallel ceases; and for the reason, that there is a radical change in their construction. With the former, a new supply of air would pass into its magazine under the cover opening thereto, more or less, in proportion to its tightness; whereas, with THE MORNING GLORY, none can pass therein, simply for the reason that the chimney flue has more power to take it in that direction than the heated fuel has to take it in under the cover to its magazine.

The practical advantages of THE MORNING GLORY will be appreciated when it is understood, that, inasmuch as the before-mentioned constructions could not be regulated by the air supply at the base, they could not be made to burn continuously, for the reason, that the air, more or less, passing down from the top caused combustion to take place *at the center of the supply coal, and at a point remote from the base*, thereby causing ashes and slag to accumulate at a point far above the base, so that, in a short time, the fire-pot would become clogged with refuse matter and half burnt coals, which could not be removed without first removing the partially consumed coals upon the grate. Whereas, with THE MORNING GLORY, atmospheric air can only reach the magazine when supplying coal thereto, and which

passes to the burning fuel, the chimney flue, by its connection with the chamber surrounding the magazine, preventing the passage of air thereto, when the stove is in operation, so that the magazine (atmospheric air being excluded) *becomes a perfect receiver.* Receiving from the heated fuel a volatile product, which is combustible; filling the interstices of the supply coal with such combustible, down to a point in the fire-pot where it meets the air coming up through the grate, where it burns, causing active combustion at the base and the exterior surfaces, and, as before written, converting the "*Magazine Stove*" into a BASE BURNING STOVE.

The MORNING GLORY is an engine of combustion, composed of certain correct principles of construction, the object of which have been to produce what should be in fact a *Base Burning Stove.* That it has been brought to a high state of perfection all will admit. And that such a stove must necessarily be economical must be self-evident; for, as the candle, when neatly trimmed, gives more light, as the result of a more perfect burning of its carbon, so will Anthracite give more heat when its carbonaceous properties are more thoroughly consumed.

It will be observed that I was the first to so organize the *Magazine Stove* that it could burn *at the base only.* And having accomplished this, together with further invention relating to this class of stoves, I sought for a term to distinguish my inventions from those which were old and well known. Hence originated the term "*Base Burner.*" It was supposed that I should be able to enjoy the exclusive right to use this term as a TRADE MARK; but it was afterward found that the LAW in that respect did not protect the right to use any words as a TRADE MARK that are descriptive of the article to be sold under it.

The purpose of this pamphlet is to impart certain facts relating to my inventions, to which the public are entitled. As to the terms "*Base Burner*" and "*Base Burning,*" there is probably no words in the English language so improperly used as these are at the present time, and it is but a simple act of fairness on my part to ventilate this matter. It is true that my *legal right* is not infringed when other manufacturers, influenced by their popularity, make use of these terms. But, when they

are applied, as is the case, to stoves, that, in principle of construction, were in existence prior to the date of my inventions, and to those that made no pretensions as BASE BURNERS, then injustice is done. No stove which employs a magazine, simply to serve as a "*feeder*" to supply coal to a fire-pot, is, or can, with truth, be called a BASE BURNER. And certainly a stove that will permit all the coal contained in its magazine to become ignited, or a stove that does not employ my inventions, has no moral right to put on the habiliments of a BASE BURNER, and claim popular favor for that reason.

A BASE BURNING STOVE is precisely such a stove as I have described it; and every stove claiming to be such, which does not correspond with this description, assumes to be what it is not.

The heating power of a BASE BURNING STOVE depends upon the size of the MAGAZINE, and its proper adjustment to the "FIRE-POT" or "FURNACE" *below* it. These two elements should be so adapted to each other as to ignite but little coal, compared with the quantity the magazine is to contain. The magazine *must be practically air-tight*, so that it may be filled, not only with coal, *but with gases generated therefrom.* The magazine and furnace should be so adapted to each other as to make it necessary to build the fire *below the magazine;* when, as the coal is consumed, that above settles, not out laterally as in the "*Bogus*" BASE BURNERS, but *down* as in the MORNING GLORY, to supply its place. With such an organization, a fire may be started with the frost of autumn, and supplying the magazine and shaking down the ashes daily, will continue for the winter. A "*millgrate*" (used in no other stove beside the MORNING GLORY) will grind up the matter that cannot be burned; and, if the lower end of the magazine (which must necessarily be the most intensely heated part of the stove) is composed of fire-brick, or some other non-combustible and slowly conducting material, the coal will be perfectly consumed; giving all its heat, and none going to hodsfull of cinders and half-burnt coal, as it does in the "*Bogus*" BASE BURNERS, where the fire-pot *alone* is the seat of power; and the magazine is used *only* as a "*feeder;*" and is composed of *cast iron*, which melts at a temperature far below that produced by the *perfect combustion* of anthracite.

The following was written and published in 1859; and by request is again published:

THEORY OF THE CHIMNEY.

As stoves cannot be used to advantage without a good chimney, I thought it not out of place to give a short chapter on the theory, and the cases and remedies of smoky chimneys.

By a law of expansion, atmospheric air and gases dilate almost equally, and nearly in proportion to their increase in temperature; and as the law of expansion applies to air in motion, the same as to air at rest, we can calculate the amount of dilation of the column of air in a chimney, from the heat of the stove. But as the heat varies, so also does the volume of ascending air. The air that passes through the fire undergoes a chemical change and becomes intensely heated, and, as it passes through the pipe and chimney, becomes reduced in temperature at every step, and if the pipe be so long that no heat can enter the chimney we shall have a poor draught.

Chimneys may have a poor draught for want of a sufficient supply of air. This is often the case in a new house, where the doors and windows fit tight. If no air can come into the room, none can go up the chimney. Another cause of smoky chimneys arises from the size of the flue. The heated air as it ascends may distribute its heat to the air in the upper part of the chimney so that the whole may be as cool, and the column within the flue be of the same weight as an equal column on the outside. In that case there will be no draught. The remedy in such case is to close every opening to the flue, except through the stove; if this does not remedy the difficulty, the only way it can be done is to carry a pipe from the stove to the top of the chimney, so as to reduce the size of the flue, or up such distance within the chimney as will convey the requisite amount of heat to its upper portion.

In many houses they do not have a separate chimney for each room, but the flue from an upper room, enters the flue from the lower room. In such case the upper chimney is too short, as the length can only be measured from the place where it enters the flue from the lower room, and this is shortened by

the distance between the entrance at the second funnel, and the top of the chimney; for that part being supplied with air from the second funnel, adds no force to the draught, and if there is no fire in the room above, it cools the current from the room below, and so retards the draught. The remedy is to close the opening where there is no fire.

HOW FLUES COUNTERACT EACH OTHER.

Chimneys very frequently counteract each other, and cause either one or both to smoke. If two stoves are in one room, with fire in both, and the doors and windows are closed tight, the stronger fire may overcome the weaker, and draw the air down the chimney and pipe of one to supply the other; the air descending the weaker, will bring the smoke and gas with it, and so fill the room. Two chimneys in different rooms, may act in the same manner when a door is opened; so also in a house in which the doors and windows fit very tight—a kitchen chimney, may overpower other chimneys in the same house, and draw the gas and smoke into the rooms.

Another cause of poor chimneys, is where their tops are commanded by higher buildings, or by a hill, so that the wind blowing over them, falls on the top of the chimney, and beats the smoke down. If the chimney cannot be raised, so that the top may be of the same height as the eminence, the only remedy is to mount some kind of a chimney cap that will remedy the difficulty.

HOW ROOMS ARE SOMETIMES FILLED WITH SMOKE.

A room where there is no fire, is often filled with smoke from the fire in another room. This arises from the changes in the temperature of the air in the cold chimney, which settles down, and draws the smoke with it.

A chimney will always have a better draught during the night than during the day, owing to the fact that the air is cooler during the night. This increased draught will continue during the morning, until the heat of day approaches, when the draught is checked until evening, when it changes again during the night. This fact should be understood, as many persons make a practice of leaving more draught on the stove during the

night than during the day, for the purpose of keeping the fire, when to accomplish that object with economy a less draught should be employed.

MY OWN OBSERVATIONS.

Many interesting cases have come under my own observation. In the early history of my stoves, I sold one to a gentleman by the name of B——, a teacher in one of the public schools at Lowell, Mass. This gentleman claimed to be somewhat scientific in such matters, and took the stove on trial for the purpose of giving me encouragement. It was put up at his residence by a mechanic in my employ, but a fire was not started, as the lady did not require it at that time. During the evening Mr. B—— called to inform me that it was impossible to start the fire. He had "tried it himself, and he was certain it could not be made to burn anything." I agreed to call next morning and remedy the difficulty. Suspecting that something was wrong about the chimney, I tested the draught by holding a lighted paper in the stove, and found the difficulty. So informed them, but they would not listen to any thing of the kind. I assured them I was right, and asked the privilege of putting the stove up in a room adjoining, as a test; to which they would not consent. Mrs. B—— was sure it was a good chimney, *as her father built the house;* she would prefer I would take the stove away and bring another, like the one I sold Mrs. S——. Being rather "*set in my way*," under such circumstances, I was determined "not to give it up so," took down the pipe, and taking an old newspaper from my pocket, twisted it into a roll of about twenty inches long, introducing one end to the pipe hole and allowing the other to project out some two or three inches, at the same time asking the lady if she would admit that the chimney was bad if the flame, on lighting the paper, was not drawn into the flue. After some discussion, she was induced to admit that if it would not, that the stove could not be expected to "*draw well.*" On lighting the paper, all the flame and smoke came into the room. The whole roll did not burn up, as the smoke in the flue smothered the fire out, so that about one-third of the paper was left. This test being satisfactory, a

mason was employed, who discovered that the flue was filled with brick and mortar, left there by the mason that built it. But the best part of the story remains to be told. I was well acquainted with the former occupant of this house, and on making inquiry found that he moved from it because they could not have a fire in the sitting-room. He informed me that "he had tried five different kinds of stoves; had them all warranted to '*draw well*,' and as none of them '*would draw*,' they were all returned," which of course went to the loss of the parties that put them up on trial.

THE WISE TRUSTEES.

Some years since I was requested to superintend the setting of one of my furnaces to warm a church at ——. The building had been remodeled, and a chimney built specially for the furnace. It seems the trustees came to the conclusion that it was necessary to have a roof for the chimney, to keep out the rain and snow, and, at the same time, make a substantial finish. A pier from each corner of the chimney was carried up about six inches high; on these piers were placed a stone covering, somewhat larger than the chimney, leaving outlets for the smoke on each of the four sides. On selecting the proper place to locate the furnace, it became necessary to use about forty feet of pipe to reach the chimney. This being rather too much to insure a good draught, caused me to examine the chimney carefully, when I discovered the covering at the top, and decided that we must either locate the furnace nearer the chimney, or remove the cap-stone. This was mentioned to the trustees, when they were not inclined to agree to it. The successful operation of the furnace was to be guaranteed, and consequently I claimed that the trustees must guarantee a good chimney. On holding a lighted paper at the pipe hole, the chimney seemed to have a perfect draught. This, it was claimed by the trustees, was a fair test. To which I objected, and for the following reasons: To use the long pipe would cool the products of combustion very much before entering the chimney, and the carbonic acid, entering the chimney at a low temperature, would become nearly cold before it reached the top, and when it should come in contact with the cold stone covering (which it would on passing

out), the stone would absorb all its contained heat; and as this gas, when cold, is heavier than air, it would fall back into the chimney, and close it so effectually that nothing could pass out. This philosophy did not satisfy the trustees; but finally a compromise was effected by which the furnace was to be set as first located, and if it was found that the draught was not good the cap stone was to be removed.

During the time the furnace was being set by the bricklayers, this cap stone was the theme of discussion, with none to adopt my theory. At one time, I had some fears it would produce a division in the society, as the Trustees had agreed to remove the stone (which had cost quite a sum of money to place it in its elevated position) without calling a meeting of that body. At any rate, it looked as though this board could not be re-elected if the stone was removed. When the job was completed, preparations were made to start the fire, the Trustees and several of their friends being present. The best of kindlings were used; and, on igniting them, the draught was so powerful that it was necessary to check it. At this, a shout of triumph was raised by the Trustees, but it was suggested by a disinterested looker on, "they had better not crow before they were out of the woods." When the kindlings were well ignited, hard coal was supplied. The fire continued to burn well until the kindlings were exhausted. It then began to cool down, and very soon the gas and smoke came out at all the joints of the pipe, filling the room to suffocation. The Trustees were not willing to give it up; and, to satisfy them, every effort was made to make the fire burn. To end the matter, I proposed to have the stone removed, and if that did not remedy the difficulty, to replace it at my expense. Ladders were procured, and in a very short time, the stone was at *terra firma*, when the fire began to burn well, causing the furnace to operate satisfactorily.

HOW A LAWYER WAS PUNISHED.

Another incident and I will bring this chapter to a close. Lawyer D——, of this city, purchased one of my patent stoves in 1856. The next season he exchanged it for the new and im-

proved pattern. After using the new stove for a few days, he called upon the party with whom he had made the exchange, and notified him that he liked the old pattern better than the new. A man was sent to make some alterations in the pipe, with a view to remedy the difficulty; and subsequent to this, several changes were made in the pipe, and also with the *dumb stove* in the room above. After using the stove for about six weeks, and suffering much inconvenience, the gentleman concluded to have the old stove put back. As this proposition did not meet the wishes of the party who made the exchange, I was called upon to help him out of the difficulty. On examination, I thought the flues of the *dumb stove* were obstructed; but this could not be, as it had been taken apart and thoroughly cleaned. I then suggested that the dumb stove be dispensed with, to which it was replied that the former stove operated perfectly in connection with it; but as I could see no other difficulty, I prevailed upon the gentleman to let me try the stove without the use of the *dumb stove.* With considerable reluctance his consent was obtained. On the change being made it was thought the fire burned better, but on calling again the same day it was claimed that there was no improvement. At this time I fixed the fire and requested them not to touch it until I should call again in the evening. On making the next call, "I was compelled to own the insufficiency of my skill." Before it was decided what to do next, I noticed for the first time a damper in the pipe, some five or six feet above the stove; but its handle indicated that it was open. On making this discovery the mystery was explained; and for the purpose of giving them a surprise, I pretended to make further examination, when the damper was turned without its being noticed. In a few minutes the stove was excessively hot. This sudden change could not be accounted for by them, as they saw I had done nothing to produce it; but after considerable speculation on their part, the cause of the difficulty was explained. The reader has already discovered that this whole difficulty arose from the carelessness of the clown that cleaned the old pipe, and put the stove up; the damper rod being put in wrong, indicated that the damper was open, when it was closed.

AN APOLOGY.

have devoted considerable space to this subject, as it is im-
tant that the causes of bad chimneys should be understood;
ıg a complicated subject, no general rule can be adopted to
ɛt the difficulties as they present themselves, under the vary-
circumstances. But the above cases include most of the
ses and the remedies. A stove should never be condemned
ause the draught is poor; rather find out the cause, and cor-
; it; as it is all wrong, and very unjust to charge the stove
h a wrong action, and excuse the chimney flue, which is gen-
ly the guilty party.

D. G. LITTLEFIELD.

ALBANY, July 20, 1869.

A NEW IDEA.

The cut on the last page of the cover represents the MORNING GLORY of 1869 as when set up for use in front of a fireplace, and having an oven attached. This oven is probably the most ingenious arrangement for the purpose that has ever been devised. It requires no change in the stove as made; can be applied temporarily, if desired, and when removed and the door (taken off to put on the oven) is replaced, the stove will be the same as though the oven had not been used. They can be applied to all the stoves made and sold last season, as well as to those of the present year.

To fit them on remove one of the mica doors, the one under the smoke pipe, and the oven fits on in its place, where it is fastened by a button, similar to the one used to hold the door up, except that it is made stronger, so as to hold the weight of the oven. A small cast-iron collar comes with the oven, which is to be riveted to the lower side of the smoke pipe, and when so riveted the sheet iron of the pipe inside of the collar is to be chiseled out, so as to form an opening to the pipe. There is a collar on the top of the oven, of the same size as the collar to be put on to the smoke pipe, and a short piece of pipe (to be made) having a damper in it (which comes with the oven) forms a connection between the flue around the oven and the smoke pipe. Care should be had to make the joints of this small pipe as perfect as possible, in order to insure a proper circulation of heat around the oven. With this damper in the small pipe open, an abundance of heat, passing in that direction because it is a shorter cut to the chimney, will pass under and around the oven, to bake perfectly; and with this small damper the temperature of the oven can be perfectly regulated. When the oven is not required for baking, by closing the small damper the stove will be the same as though the oven were not attached to it. There are two small boiler holes in the top of this oven which will be of some service, besides affording access to the flue to clean it out occasionally.

Address all orders to the

LITTLEFIELD STOVE MANUFACTURING CO.,

D. G. LITTLEFIELD, General Superintendent, Albany, N.Y.

RD-161

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